CORTEZ III SERVICE CORPORATION
NASA/GODDARD SPACE FLIGHT CENTER
CODE 239, BLDG 27
GREENBELT, MD 20771
FAX (301) 286-1774

DATE: April 20, 2001 _____ **#PAGES (including cover sheet)**

TO: Stanley R. Schneider
AT: _____
PHONE (VOICE/FAX) _____

FROM: ODELL YOUNG, IMPORT/EXPORT SPECIALIST
PHONE: (301) 286-6388
EMAIL: oyoung@pop200.gsfc.nasa.gov

IF YOU DO NOT RECEIVE ALL TRANSMITTED SHEETS, PLEASE CALL
(301) 286-6388

Comments:

Dept. of State Case TA221-00B

Mr. Schneider,

Please review the attached case and advise if it is in accordance with your program requirements. Your reply via email within the next seven days will be appreciated.

ODELL

Lockheed Martin Missiles & Space
1111 Lockheed Martin Way, P.O. Box 3504 Sunnyvale, California 94089-3504

In Reply Refer to P458947

PM/DTC Code 110412338
March 9, 2001

Mr. William J. Lowell
Director
Office of Defense Trade Controls
2401 E Street, NW
U.S. Department of State
Washington, D.C. 20037

Subject: **Amendment No. 2 Technical Assistance Agreement TA 221-00** between Lockheed Martin Missiles & Space and SAAB Ericsson Space AB, Sweden. Austrian Aerospace, Austria. **and to add the Danish Meteorological Institute, Denmark , and Terma Elektronik AS, Denmark for integration of the Swedish Global Positioning System Occultation Sensor (GPSOS) and the export and import of support test equipment, spacecraft electronics and the spacecraft interface simulator.**

Dear Mr. Lowell:

Submitted herewith is the original and nine copies of a proposed **Amendment No. 2** to Technical Assistance Agreement TA 221-00, between Lockheed Martin Missiles & Space (LMMS) and Saab-Ericsson Space AB, (Saab) Austrian Aerospace (AA), a sub-contractor to Saab, *the parties desire to amend this agreement to:*

1) *incorporate the additional licensees* the **Danish Meteorological Institute (DMI), a sub-contractor to Saab, and Terma Elektronik AS(Terma), a sub-contractor to Saab**.; and
2) *incorporate the amended scope of this TAA and Statement of Work, to include the* **exchange of technical data and defense services between the parties relating to (1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed *for the National Polar-orbiting* Operational Environmental Satellite System (NPOESS) (2) the requirement to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the LMMS spacecraft and (5) the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.**
3) *to increase the dollar value from $60,000 to $ 21,487,000 to include PDRR and EMD phases.*

4) amend proviso Number 5 of TA 221-00, approved April 18, 2000, to allow for the export/import of hardware.

Approval of the TAA is requested by May 2, 2001.

LMMS had submitted Amendment A to this Agreement for relief of Proviso #11 on December 18, 2000.

In accordance with 22 CFR 124.12, the following information is provided:

(a) (1) The PM/DTC applicant code is 110412338.

(a) (2) **Change Amendment No. 2 - This amendment adds DMI, a subcontractor to Saab and Austrian Aerospace, located at Lyngbyvej 100 DK-2100 Copenhagen, Denmark; and Terma, subcontractor to Saab, located at Brejneroedvej 144, DK-3460 Birkeroed, Denmark.**

Modification to the scope of this agreement entails Lockheed Martin Missiles & Space exchanging data, providing defense services (see Statement of Work) for (1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed for NPOESS (2) the requirement to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the LMMS spacecraft and (5) the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.

PRECENDENT LICENSING

-TAA TA 730-00, approved August 7, 2000- technical data and assistance concerning the Data Collection System (DCS) and the Search and Rescue Processor (SARP) built by the Centre National D'Etudes Spatiale of France.

-TAA TA 729-00, approved August 7, 2000- technical data and assistance concerning the French Altimeter Instrument built by Alcatel Space Industries of France.

-TAA TA 1670-00, approved January 29, 2001-technical data and assistance for Definition and Operation of a Ground Station for the NPOESS Satellite

The agreement is valid through December 31, 2005.

(a) (3) **Change – Amendment No. 2** - The NPOESS program is managed by an Integrated Program Office (IPO) which is a tri-agency represented by NASA, the Department of Defense, and the Department of Commerce. The purpose of the NPOESS

is to collect satellite-based global multispectral radiometry and other specialized meteorological, oceanographic, and solar-geophysical data and to disseminate the data to the program's central users and field users deployed worldwide.

There are several phases to the NPOESS program.

THE NPOESS PROGRAM

(i) The Development of Environmental Sensors

Beginning in 1997, the IPO issued contracts for the development of five major sensors that are to be integrated on future NPOESS satellites. An important element of the contracts was the ultimate delivery to the IPO of the sensor plus algorithms that allow environmental parameters to be retrieved from the remotely-sensed data. One of the contracts is with Saab for the development of the GPSOS and its retrieval algorithms. Saab, AA, **DMI and Terma,** will continue the development of the GPSOS during the current Phase of their contract which extends with options beyond 2005.

Recently the IPO changed its acquisition strategy and will now require LMMS to establish contracts with the sensor vendors and to import/export hardware as necessary.

If required, the IPO will obtain their own import/export licensing from DTC.

(ii) The Program Definition and Risk Reduction Phase

LMMS is currently under contract - number #F04701-00-C-0501 - with the IPO. The contract is for the NPOESS Program Definition and Risk Reduction (PDRR) phase to provide a single, national polar-orbiting remote sensing capability to acquire, receive, and disseminate global and regional environmental data. A similar PDRR contract was awarded to TRW by the NPOESS IPO. A competitively awarded contract will be awarded for the Engineering and Manufacturing Development (EMD)/Production phase of the NPOESS program in March 2002.

The purpose of the PDRR contract is to reduce the risk of integrating the five NPOESS sensors onto the baseline of the LMMS satellite. The PDRR phase will end on 30 March 2002 or, if an option to the contract is exercised, on 31 December 2002. During PDRR LMMS will develop a baseline architecture for integrating all NPOESS sensors onto a satellite. In order to develop a viable baseline, LMMS will exchange information with Saab, AA, **DMI, and Terma** relating to the physical, electrical, mechanical, and thermal characteristics of the GPSOS. Similarly, during the LMMS PDRR phase of the program, Saab, AA, **DMI, and Terma** will acquire information from LMMS relating to the satellite constraints for the physical mounting of the GPSOS. The outcome of the interchange will be a satellite design that incorporates the GPSOS in a manner that is feasible, economical, and optimizes overall performance.

Finally, LMMS will also need to exchange technical data and provided defense services with Saab, AA, **DMI and Terma** to prepare a proposal for the following phase of the program, EMD.

For further information, see attached Statement of Work.

(iii) The Engineering and Manufacturing Development (EMD)/Production Phase

The next phase in the NPOESS program, EMD/Production, will call for the building of five satellites, ground stations, and data processing for systems operations. Although the sensor complement for each of the satellites is variable, the plan is to incorporate a GPSOS sensor on each of the NPOESS satellites. At EMD/Production Award, the IPO will transfer the responsibility for the operation, maintenance, upgrading, and performance of the sensors to the successful EMD/Production contractor. During EMD, LMMS will import the GPSOS into the United States in order to integrate it onto its satellites. LMMS may have to temporarily export it should problems arise with the instrument. LMMS will also export and import **support test equipment, spacecraft electronics, and the spacecraft interface simulator. For this reason LMMS is concurrently applying for a DSP-73, DSP-61, DSP-5, as required.**

(a) (4) No Change

(a) (5) No Change

(a) (6) **Change Amendment No. 2** - The total value of the NPOESS PDRR contract to LMMS for the period from 13 December, 1999 to 30 March 2002 is $20,650,000.00; an option in the PDRR contract includes a Preliminary Design Review with an added value of $25.600,000.00 and an extension to 31 December 2002. The estimated value of the effort to be performed under this agreement with Saab, AA, **DMI and Terma** is $60,000.00. **The addition of DMI and Terma to this TAA does not change the value that was provided in TA 221-00 which is $60,000 for this PDRR phase; however, the estimated value of the EMD phase is $21,427,000. The total estimated value of PDRR and EMD is $21,487,000.** The value is divided into the following items:

<u>Change – Amendment No. 1</u> - For the EMD phase, the overall value of LMMS' contract with the IPO will be approximately $2 billion. The estimated value of work to be performed under the EMD phase of the contract with Saab, AA, Terma and DMI is estimated at $21,427,000.00 which includes five sensors through EMD. The value is divided into the following items:

No.	EMD - Description		Estimated Value
i)	Hardware may be provided to Saab by LMMS	$ 15,000	
ii)	Hardware will be provided to LMMS	$ 21,000,000	$ 21,015,000

	by Saab		
iii)	**Documentation of the LMMS requirements for integrating GPSOS instruments onto LMMS satellites**	**$**	**12,000**
iv)	**No software will be provided to Saab by LMMS**	**$**	**0**
v)	**Assistance and services associated with the exchange of information to effect a workable and efficient configuration of the GPSOS units on the LMMS satellites will be provided by LMMS**	**$**	**400,000**
	Total EMD Phase	**$**	**21,427,000**
	Total PDRR Phase	**$**	**60,000**
	TOTAL PDRR and EMD PHASES	**$**	**21,487,000**

Pursuant to 22 CFR Part 130, no fees/commissions have been offered/paid in consideration of this TAA or its approval.

(a) (7) No foreign military sales credits or loan guarantees are or will be involved in financing the agreement.

(a) (8) Not applicable.
(a) (9) Not applicable.
(b) (1) If the agreement is approved by the Department of State, such approval will not be construed by Lockheed Martin Missiles & Space as passing on the legality of the agreement from the standpoint of antitrust laws or other applicable statutes, nor will Lockheed Martin Missiles & Space construe the Department's approval as constituting either approval or disapproval of any of the business terms or conditions between the parties to the agreement.

(b) (2) Lockheed Martin Missiles & Space will not permit the proposed agreement to enter into force until it has been approved by the Department of State.

(b) (3) Lockheed Martin Missiles & Space will furnish the Department of State with one copy of the signed agreement within 30 days from the date that the agreement is concluded and will inform the Department of its termination not less than 30 days prior to the expiration and provide information on the continuation of any foreign rights or the flow of technical data to the foreign party. If a decision is made not to conclude the agreement, Lockheed Martin Missiles & Space will so inform the Department within 60 days.

(b) (4) **Change - Amendment No. 2** - This agreement grants the right to sub-license. Prior to the release of any technical data, Saab, Austrian Aerospace, **DMI and/or Terma**

will execute a Non-Disclosure Agreement (NDA) incorporating all of the provisions of the basic agreement which refer to the U.S. Government and the Department of State (22 CFR 124.8). Copies of the executed NDAs, referencing this agreement by number, will be maintained by Lockheed Martin Missiles & Space for five years from the expiration of the agreement.

To facilitate U.S. Government consideration of this request, the agreement contains the following provisions currently required by the ITAR:

Pursuant to 22 CFR 124.7:

CFR Section	Agreement Reference
124.7(1)	Paragraph 3I(1)
124.7(2)	Paragraph 3I(2)
124.7(3)	Paragraph 3I(3)
124.7(4)	Paragraph 3I(4)

Pursuant to 22 CFR 124.8:

CFR Section	Agreement Reference
124.8(1)	Paragraph 3II(1)
124.8(2)	Paragraph 3II(2)
124.8(3)	Paragraph 3II(3)
124.8(4)	Paragraph 3II(4)
124.8(5)	Paragraph 3II(5)
124.8(6)	Paragraph 3II(6)

Defense articles **will** be shipped in furtherance of this agreement.

Pursuant to 22 CFR 121.16, the items intended for export in connection with this agreement are not identified in the MTCR.

Pursuant to 22 CFR 123.15 and 124.11, the items intended for export in connection with this agreement do not require Congressional Notification.

This agreement relates to the following U.S. Munitions List categories:
Category XV Space Systems and Associated Equipment (c), (e), and (f).

A Nontransfer and Use Certificate, Form DSP-83, as required for SME, classified articles or classified technical data is not attached in accordance with 22 CFR 124.10.

The following U.S. Government agency is familiar with the items intended for export in connection with this agreement:

NPOESS Integrated Program Office (IPO)

E/IP Centre Building
8455 Colesville Rd, Suite 1450
Silver Spring, Md 20910

The contact person at the IPO is: CAPT. Craig Nelson, (phone: 301-427-2070)

The parties WILL NOT utilize a Lockheed Martin International field office to support the efforts undertaken under this agreement.

Lockheed Martin Missiles & Space is anticipating to export / import hardware and software in connection with this agreement and therefore, is requesting DTC to amend proviso #5 to allow for the export of hardware under an export license (DSP 5, 73, 61) for the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator. If required, LMMS will temporarily return the foreign produced GPSOS for repair.

The NPOESS Program does not involve the release of any USG telemetry, encryption, COMSEC, TRANSEC data or systems. None of this information will be transferred in any manner with Saab, Austrian Aerospace, **DMI and/or Terma**.

LMMS technical point of contacts are:
Jeff Smith: 408-743-1476 Ron Harten: 408-756-2325

If you require other information relating to this agreement please contact the undersigned at (408) 743-4865 or Mr. John Joyce in our Crystal City office at (703) 413-5676.

Sincerely,

Jack W. Ciechon
Director, International Licensing
Empowered Official

Attachments:

Amendment No. 2 - Letter of Transmittal, original and 9 copies
Amendment No. 2 - Proposed Agreement (with Statement of Work), 9 copies
TAA TA 221-00 basic, 9 copies
Freight Forwarders Sheet, 9 copies
22 CFR 126.13 Certification Letter, original and 1 copy

LOCKHEED MARTIN

TAA between Lockheed Martin Missiles & Space, SAAB Ericsson Space AB, Sweden, and Austrian Aerospace, Austria, **DMI, Denmark and Terma, Denmark**

Lockheed Martin Corporation
PM/DTC Applicant Code: 110412338
Date:March 9, 2001

Names and addresses of all U.S. consignors and freight forwarders who may be involved in this transaction:

1. UNISTAR Air Cargo
377 Swift Avenue
South San Francisco, CA 94080

2. Expeditors International
578 Eccles Ave.
South San Francisco, CA 94080

3. TNT Skypack
875 Stanton Road
Burlingame, CA 94010

4. DHL Airways, Inc.
1346 Bordeaux Dr.
Sunnyvale, CA 94089

5. American Airlines
875 Mahler Road, Suite 248
Burlingame, CA 94010

6. Consolidated Freightways
390 Commercial St.
San Jose, CA 95012

7. Burlington Air Express
342 Allerton Ave.
South San Francisco, CA 94080

8. Federal Express
1286 Lawrence Station Rd.
Sunnyvale, CA 94089

9. Air Canada
Cargo Building No. 7
San Francisco, CA 94128

10. Emery Worldwide
501 S. Airport Blvd.
South San Francisco, CA 94080

11. United Airlines
San Francisco Int'l Airport
San Francisco, CA 94128

12. Schenkers Int'l Agencies
380 Littlefield Ave.
South San Francisco, CA 94080

13. EAC Steamship Agencies
201 Spear St., Suite 200
San Francisco, CA 94015

14. Air Express International
120 Tokeneke Rd., P.O. Box 1231
Darien, CT 06820

15. Express Freight International
1210 San Mateo Ave.
South San Francisco, CA 94080

16. Hand Carry
Lockheed Martin Missiles & Space
Sunnyvale, CA 94089

Lockheed Martin Missiles & Space
1111 Lockheed Martin Way Sunnyvale, California 94089

LOCKHEED MARTIN

PM/DTC Applicant Code: 110412338
March 9, 2001

Mr. William J. Lowell, Director
Office of Defense Trade Controls
PM/DTC, Room 200, SA-6
Department of State
Washington, D.C. 20520

Subject: CERTIFICATION REQUIRED BY 22 CFR 126.13

Dear Mr. Lowell:

In compliance with 22 CFR 126.13, I hereby state that I am a responsible official empowered by the applicant, Lockheed Martin Corporation. Furthermore, to the best of my knowledge and belief:

On June 22, 1994, Lockheed Corporation, a predecessor corporation of the applicant, and two former employees were charged by indictment with offenses enumerated in 22 CFR § 120.27 (6) and (12), specifically the Foreign Corrupt Practices Act and conspiracy to violate the Act. On August 18, 1994, Lockheed Corporation was informed in a letter from Thomas E. McNamara, Acting Assistant Secretary of State, Political-Military Affairs, that the State Department's policy to deny export license applications and other request for approval pursuant to Section 38 of the Arms Export Control Act (AECA) (22 USC § 2778) and its implementing regulations. the International Traffic in Arms Regulation (ITAR) (22 CFR 120 - 130) with respect to Lockheed Corporation is restricted to apply only to Lockheed Aeronautical Systems Company (LASC) and "does not affect any other division of Lockheed Corporation". In settlement of charges relating to the aforementioned indictment, on January 27, 1995, Lockheed entered into a Plea Agreement, whereby Lockheed plead guilty to a single count of conspiracy to violate the Foreign Corrupt Practices Act, 18 U.S.C. § 371, and agreed to pay criminal and civil fines. On August 21, 1995, the State Department granted reinstatement of Lockheed Aeronautical Systems Company's export/retransfer privileges effective August 18, 1995.

Lockheed Martin Missiles & Space is an operating company within the Space and Strategic Missiles Sector of Lockheed Martin Corporation. Except as set forth above, neither Lockheed Martin Corporation, nor the chief executive officer, president, vice-presidents, other senior officers of officials, nor any member of the board of directors is ineligible to contract with, or to receive a license or other approval to import defense articles or defense services from, or to receive and export license or other approval from any agency of the U.S. Government. No party to the export as defined in 22 CFR 126.7(e) has been convicted of violating any of the U.S. criminal statutes enumerated in 22 CFR 120.27 since the effective date of the Arms Export Control Act, Public Law 94-329, 90 Stat. 729 (June 30, 1976), or is ineligible to contract with, or to receive a license or other approval to import defense articles or defense services from or to receive an export license or other approval from, any agency of the U.S. Government. The undersigned is a citizen of the United States of America, is directly employed by the applicant, holds a position having authority for policy or management within the applicant organization, and is empowered in writing by the applicant as an Empowered Official in accordance with 22 CFR 120.25.

Sincerely,

Jack W. Siechon
Director, International Licensing
Empowered Official

S3C1-2000

United States Department of State

Bureau of Political-Military Affairs
Office of Defense Trade Controls

Washington, D.C. 20037

In Reply Refer to
ODTC Case TA 221-00A

YOUR LETTER DATED: December 11, 2000
AGREEMENT FOR: Technical Assistance - Amendment
FOREIGN LICENSEE: Saab Eriesson Space A.B.—Sweden: Austrian Aerospace—Austria
COMMODITY: Technical Data and Assistance for Integration of the GPS Occultation Sensor onto NPOESS Satellites—modify proviso: DTRA data approval before export

Dear Mr. Ciechon:

The Department of State has received your request for reconsideration of subject proviso. As a result, proviso No. 11 is revised as follows:

"Lockheed Martin will submit all technical data for DTRA review and approvals before being exported to the foreign parties identified in the agreement. The TTCP will also be modified to reflect the same and require written concurrence by DTRA."

Other limitations, provisos, or other requirements contained in the basic agreement (TA 221-00) as amended, except as modified hereby, continue to apply.

A copy of this letter must be attached to DTC's letter dated April 18, 2000 .

Sincerely yours,

for William J. Lowell
Director
Office of Defense Trade Controls

TO:

Mr. Jack Ciechon
Lockheed Martin Coporation
1725 Jefferson Davis Hwy, Suite 900
Arlington, VA 22202

1217-2000

United States Department of State

Bureau of Political-Military Affairs
Office of Defense Trade Controls

Washington, D.C. 20520–0602

In Reply Refer to
ODTC Case TA 221-00

APR 18

YOUR LETTER DATED: January 27, 2000
AGREEMENT FOR: Technical Assistance
FOREIGN LICENSEE: Saab Ericsson Space AB – Sweden; Austrian Aerospace - Austria
COMMODITY: Technical Data and Assistance for Integration of the GPS Occultation Sensor onto NPOESS Satellites

Dear Mr. Callan:

The Department of State approves the request as identified subject to the limitations, provisos or other requirements stated below. The agreement may not enter into force until these requirements have been satisfied. Any request for extension must be submitted to the Department for approval no later than 60 days prior to the authorized expiration date.

Sincerely yours,

William J. Lowell
Director
Office of Defense Trade Controls

LIMITATIONS, PROVISOS AND OTHER REQUIREMENTS:

1. This authorization expires December 31, 2005.

2. If the agreement grants any rights to sublicense, prior to the release of any technical data, the sublicensee must execute a Non-Disclosure Agreement (NDA) incorporating all the provisions of the basic agreement which refer to the U.S. Government and the Department of State (i.e., 22 CFR 124.8 and/or 124.9). Copies of the executed NDAs, referencing this ODTC case number, must be maintained by the applicant for five years from the expiration of the agreement.

Continued on Page 2

Mr. John L. Callan
Lockheed Martin Corporation
1725 Jefferson Davis Hwy, Suite 900
Arlington, VA 22202

In Reply Refer to
ODTC Case TA 221-00

3. No shipments of either hardware, software, technical data or defense services may take place against this agreement until such time as the agreement has been executed by all parties. In accordance with 22 CFR 124.12(b)(3), a signed copy of the agreement, revised as may be required hereby, must be submitted to this office within 30 days from the date that it is signed. If a decision is made not to execute the approved agreement, you must so inform this office within 60 days.

4. If the agreement is not executed within one year of the date of this approval, a written report as to the status of the agreement must be submitted to this office on an annual basis until the requirements of 22 CFR 124.4 or 22 CFR 124.5 have been satisfied.

5. Shipment of hardware against this agreement under the provisions of 22 CFR 123.16(b)(1) or by separate license (i.e., DSP-5) is not authorized. Hardware shipment may take place only after the Department of State approves an amendment to the agreement.

6. This agreement is limited to the task specifically described in the agreement application for the PDRR phase only.

7. Manufacturing technology, systems optimization/integration know-how or design know-how must not be offered or released.

8. Comparisons with capabilities or limitations of DOD systems (when identified as such) must not be released.

9. Lockheed Martin must abide by the Technology Transfer Control Plan (TTCP) as submitted with the application. Point of contact is DTRA/STS (703-325-3049, fax 703-325-7522).

10. Lockheed Martin must maintain a library of released technical data, (per ITAR 22 CFR 122.5) subject to U. S. Government inspection and audit.

11. All technical interchanges with the foreign end user on this project must have a DOD monitor present unless exempted by DOD/Defense Threat Reduction Agency Technology Security Directorate (DTRA/ST). Monitors must be granted full access to Lockheed Martin facilities, equipment and documents. Lockheed Martin will notify DTRA, in writing (703-325-3049, fax 325-7522), 40 days in advance of overseas technical meetings in support of this license, 15 days when meetings are held in the continental U. S., and 5 days prior for TELECONS.

Continued on Page 3

In Reply Refer to
ODTC Case TA 221-00

12. Lockheed Martin must abide by the existing reimbursement procedure with DTRA/FM for the reimbursement of funds expended by the Department of Defense, pursuant to Public Law 105-261, in execution of this agreement. For questions regarding reimbursement contact DTRA/FM (703 810-4320).

13. Provide a copy of this approval letter to NASA HQ, Code ID/Paula Geisz, 300 E. Street, SW, Washington, DC 20546.

TECHNICAL ASSISTANCE AGREEMENT

BETWEEN

LOCKHEED MARTIN MISSILES & SPACE

AND

SAAB-ERICSSON SPACE AB, Sweden,

And

AUSTRIAN AEROSPACE, Austria

This Agreement is entered into between Lockheed Martin Corporation, a corporation of the State of Maryland, for its division Lockheed Martin Missiles & Space (hereinafter referred to as "LMMS") with offices at 1111 Lockheed Martin Way, P.O. Box 3504, Sunnyvale, California, United States of America, 94089-3504, and Saab-Ericcson AB (hereinafter referred to as "Saab") whose office is situated at S-405 15 Göteberg, Sweden, and Austrian Aerospace whose office is situated at Bretenfurter Strasse 106-108, A-1120 Vienna, Austria, and is effective upon the date of signature of the last party to sign the Agreement. LMMS, Saab, and Austrian Aerospace are hereinafter referred to as the Parties.

WHEREAS, LMMS desires to exchange technical data and provide defense services to Saab and Austrian Aerospace relating to (1) the requirements to integrate the Global Positioning System Occultation Sensor (GPSOS) onto the LMSS baseline satellite for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) and (2) the requirements to evaluate the performance of the algorithms for the retrieval of environmental parameters, and

WHEREAS, LMMS is under contract (Number F04701-00-C-0501) with the Integrated Program Office comprised of Department of Commerce, NASA and the Department of Defense (see Statement of Work), and

WHEREAS, the IPO will obtain their own import and export licensing from the Department of State as required, and

WHEREAS, Saab is under contract with the IPO to provide both the GPSOS and its retrieval algorithms for environmental parameters, and

WHEREAS, Austrian Aerospace is under a sub-contract to Saab to help in the development of the hardware for the GPSOS, and

WHEREAS, it is the intent of the IPO to provide the GPSOS to the contractor (LMMS or TRW) selected for the Engineering and Manufacturing Development phase of NPOESS, and

WHEREAS, Saab and Austrian Aerospace desire to receive technical data and defense services related to the integration of the GPSOS and its retrieval algorithms onto the LMMS baseline satellite designed for NPOESS,

NOW THEREFORE, the parties desire to enter into this Technical Assistance Agreement as follows:

1. This Technical Assistance Agreement is intended to enable LMMS to perform defense services and disclose technical data during the Program Definition and Risk Reduction (PDRR) Phase in support of the requirements to integrate the GPSOS sensor onto the baseline NPOESS satellites and to evaluate the requirements for the retrieval of environmental parameters from the GPSOS.

There are several phases to the NPOESS program.

(i) The Development of Environmental Sensors

Beginning in 1997, the IPO issued contracts for the development of five major sensors that are to be integrated on future NPOESS satellites. An important element of the contracts is the ultimate delivery to the IPO of the sensor plus algorithms that allow environmental parameters to be retrieved from the remotely-sensed data. One of the contracts is with Saab for the development of the GPSOS and its retrieval algorithms. Saab and its subcontractor, Austrian Aerospace, will continue the development of the GPSOS during the current Phase of their contract which extends with options beyond 2005.

(ii) The Program Definition and Risk Reduction

LMMS is currently under contract - number #F04701-00-C-0501 - with the IPO. The contract is for the NPOESS Program Definition and Risk Reduction (PDRR) phase to provide a single, national polar-orbiting remote sensing capability to acquire, receive, and disseminate global and regional environmental data. A similar competitive PDRR contract was awarded to TRW by the NPOESS IPO, and a down-select contract will be awarded to either LMMS or TRW for the Engineering and Manufacturing Development (EMD)/Production phase of the NPOESS program. One element of the PDRR contract is to reduce the risk of integrating the five NPOESS sensors, including GPSOS, onto the baseline of the LMMS satellite. The PDRR phase will end on 30 March 2002 or, if an option to the contract is exercised, on 31 December 2002.

The primary exchange of information to be carried our under this TAA will take place during the PDRR phase of the NPOESS program - namely from 1 March 2000 through

31 December 2002. The exchange of data includes the requirements for (1) spacecraft to GPSOS instrument interface specifications, (2) test plans and procedures specific to the GPSOS interface and instrument performance, and (3) interface drawings and analysis for instrument specific mechanical, thermal, electrical, data processing, flight software and fields-of-view analysis (optical, radio frequency, and thermal). In addition, the expected performance of the algorithms to retrieve environmental parameters using data from the GPSOS is required information to be provided by Saab to LMMS.

(iii) The Engineering and Manufacturing Development (EMD)/Production

The next phase in the NPOESS program, the EMD/Production, will call for the building of three satellites with an option to build four additional satellites. Although the sensor complement for each of the satellites is variable, the plan is to incorporate a GPSOS sensor on each of the seven NPOESS satellites. At an early stage in the EMD/Production phase, the IPO will transfer the responsibility for the operation, maintenance, upgrading, and performance of the sensors to the successful EMD/Production contractor; i.e. either LMMS or TRW. If selected for the EMD phase, LMMS will amend this TAA to accommodate these additional tasks.

2. It is understood that this Technical Assistance Agreement is entered into as required under U.S. Government regulations and, as such, it is an independent agreement between the parties, the terms of which will prevail, notwithstanding any conflict or inconsistency that may be contained in other arrangements between the Parties on the subject matter.

3. The parties agree to comply with all applicable sections of the International Traffic in Arms Regulations (ITAR) of the U.S. Department of State and that, more particularly, in accordance with such regulations the following conditions apply to this Agreement:

I. ITAR 124.7

(1) Data to be exchanged includes that necessary to integrate a GPSOS instrument and its retrieval algorithms with an NPOESS baseline spacecraft. Such data includes the requirements for (1) spacecraft to instrument interface specifications, (2) test plans, procedures and resulting data specific to the instrument interface and instrument performance, and (3) interface drawings and analysis for instrument specific mechanical, thermal, electrical, data processing, flight software and fields-of-view analysis (optical, radio frequency, and thermal) (see attachment A, Statement of Work).

All technical data and defense services transferred by Saab and Austrian Aerospace to LMMS under this agreement pertains solely to the performance of retrieval algorithms and the interface between the LMMS architecture of the baseline spacecraft and the GPSOS instrument and does not represent a transfer of technical data or defense services specific to the design, manufacture, assembly or test of the NPOESS

spacecraft itself. LMMS will transfer to Saab and Austrian Aerospace software interface specifications pertaining to GPSOS specific flight software data processing and ground support. No LMMS software code or algorithms will be exchanged.

As currently envisioned. LMMS does not anticipate any requirement to export LMMS owned hardware in connection with this agreement however, a GPSOS instrument and associated Saab- owned special test equipment may be returned to the NPOESS IPO.

(2) The technical assistance and data to be provided under this agreement includes all tasks associated with (1) the requirements for the GPSOS algorithms for the retrieval of environmental parameters, and (2) the specifications for receiving, inspecting, bench level testing, installing on the baseline spacecraft, aligning on the baseline spacecraft, functionally verifying the instrument-to-spacecraft interface via spacecraft level testing and storing. Additionally, LMMS will assist Saab in establishing the methodology for the review of instrument level and spacecraft level interface test data and anomaly resolution as required.

(3) The agreement is valid through 31 December 2005.

(4) The effort intended to be accomplished under this agreement will take place in Sweden. Austria, or the United States of America. There is no other country or area in which manufacturing, processing. sale or other form of transfer is to be licensed.

II. ITAR 124.8

(1) This Agreement shall not enter into force and shall not be amended or extended without the prior written approval of the Department of State of the U.S. Government.

(2) This Agreement is subject to all United States laws and regulations relating to exports and to all administrative acts of the U.S. Government pursuant to such laws and regulations.

(3) The Parties to this Agreement agree that the obligations contained in this Agreement shall not affect the performance of any obligations created by prior contracts or subcontracts which the Parties may have individually or collectively with the U.S. Government.

(4) No liability will be incurred by or attributed to the U.S. Government in connection with any possible infringement of privately owned patent or proprietary rights, either domestic or foreign. by reason of the U.S. Government's approval of this Agreement.

(5) The technical data or defense service exported from the United States in furtherance of this Agreement and any defense article which may be produced or manufactured from such technical data or defense service may not be transferred to a person in a third country or to a national of a third country except as specifically authorized in this Agreement unless the prior written approval of the Department of State has been obtained.

(6) All provisions in this Agreement which refer to the United States Government and the Department of State will remain binding on the Parties after the termination of the Agreement.

4. It is understood that disclosure of information by Saab to LMMS is subject to any rules, restrictions or laws of Sweden. It is understood that disclosure of information by Austrian Aerospace to LMMS is subject to any rules, restrictions or laws of Austria.

5. Technical data relating to this program may be exchanged with Saab and/or Austrian Aerospace contractors/subcontractors provided that, prior to the release of any technical data, Saab executes a Non-Disclosure Agreement (NDA) with each company. The NDA will incorporate all of the provisions of the basic Agreement which refer to the U.S. Government and the Department of State (i.e., 22 CFR 124.8 and/or 124.9). Copies of the executed NDAs referencing this Agreement by number will be provided to and maintained by LMMS for five years from the expiration of the Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed effective as of the day and year above provided.

Lockheed Martin Missiles & Space

By _____

Printed Name Jeffrey S. Smith

Title NPOESS Program Director

Date 6/27/00

Saab-Ericsson Space AB

By _____

Printed Name Anders Lind

Title General Manager Microwave Products Division

Date 2000-05-30

Austrian Aerospace

By _____ _____

Printed Name ~~Dipl. Ing. Folke BRUNDIN~~ Managing Director — Dr. Bernhard EICHINGER Prokurist

Title _____

Date 06/16/00 — 16/06/00

Attachment A

STATEMENT OF WORK

Between

Lockheed Martin Missiles & Space (LMMS)

And

Saab-Ericsson Space AB, Sweden,

And

Austrian Aerospace, Austria

For the
Global Positioning System Occultation Sensor (GPSOS)

TABLE OF CONTENTS

1.0 INTRODUCTION

This Technical Assistance Agreement is intended to enable LMMS to perform defense services and disclose technical data during the Program Definition and Risk Reduction (PDRR) Phase in support of the requirements to integrate the GPSOS sensor onto the baseline NPOESS satellites and to evaluate the requirements for the retrieval of environmental parameters from the GPSOS.

There are several phases to the NPOESS program.

(i) The Development of Environmental Sensors

Beginning in 1997, the IPO issued contracts for the development of five major sensors that are to be integrated on future NPOESS satellites. An important element of the contracts is the ultimate delivery to the IPO of the sensor plus algorithms that allow environmental parameters to be retrieved from the remotely-sensed data. One of the contracts is with Saab for the development of the GPSOS and its retrieval algorithms. Saab and its subcontractor, Austrian Aerospace, will continue the development of the GPSOS during the current Phase of their contract which extends with options beyond 2005.

(ii) The Program Definition and Risk Reduction

LMMS is currently under contract - number #F04701-00-C-0501 - with the IPO. The contract is for the NPOESS Program Definition and Risk Reduction (PDRR) phase to provide a single, national polar-orbiting remote sensing capability to acquire, receive, and disseminate global and regional environmental data. A similar competitive PDRR contract was awarded to TRW by the NPOESS IPO, and a down-select contract will be awarded to either LMMS or TRW for the Engineering and Manufacturing Development (EMD)/Production phase of the NPOESS program. One element of the PDRR contract is to reduce the risk of integrating the five NPOESS sensors, including GPSOS, onto the baseline of the LMMS satellite. The PDRR phase will end on 30 March 2002 or, if an option to the contract is exercised, on 31 December 2002.

The primary exchange of information to be carried our under this TAA will take place during the PDRR phase of the NPOESS program - namely from 1 March 2000 through 31 December 2002. The exchange of data includes the requirements for (1) spacecraft to GPSOS instrument interface specifications, (2) test plans and procedures specific to the GPSOS interface and instrument performance, and (3) interface drawings and analysis for instrument specific mechanical, thermal, electrical, data processing, flight software and fields-of-view analysis (optical, radio frequency, and thermal). In addition, the expected performance of the algorithms to retrieve environmental parameters using data from the GPSOS is required information to be provided by Saab to LMMS.

(iii) The Engineering and Manufacturing Development (EMD)/Production

The next phase in the NPOESS program, the EMD/Production, will call for the building of three satellites with an option to build four additional satellites. Although the sensor complement for each of the satellites is variable, the plan is to incorporate a GPSOS sensor on each of the seven NPOESS satellites. At an early stage in the EMD/Production phase, the IPO will transfer the responsibility for the operation, maintenance, upgrading, and performance of the sensors to the successful EMD/Production contractor: i.e. either LMMS or TRW. If selected for the EMD phase, LMMS will amend this TAA to accommodate these additional tasks.

2.0SCOPE

The scope of this effort during the PDRR phase of the LMMS contract with the IPO, consists of Lockheed Martin Missiles and Space (LMMS) exchanging technical date and providing defense services to Saab Ericsson Space AB (Saab) and Austrian Aerospace necessary for the development of the Global Position System Occultation Sensor (GPSOS). The GPSOS is currently under development by Saab and Austrian Aerospace through a contract with the Integrated Program Office of the United States Government. The work will enable LMMS, Saab, and Austrian Aerospace to disclose technical data and provide defense services in support of (1) the integration of the GPSOS instrument onto the baseline architecture of the LMMS satellite that is proposed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) and (2) the evaluation of the GPSOS algorithms for the retrieval of environmental parameters.

3.0 OBJECTIVE

The objective of the efforts is to exchange technical date and provide defense services associated with installing the GPSOS on an LMMS baseline spacecraft. The work includes information on the requirements for (1) the alignment of the GPSOS on the spacecraft, (2) functionally verifying the instrument-to-spacecraft interface, and (3) verifying the performance to retrieve environmental data from simulated GPSOS data.

Such technical data to be exchanged includes, but is not limited to (1) spacecraft to instrument interface specifications, (2) test plans and procedures specific to the instrument interface and instrument performance, (3) interface drawings and analysis for instrument specific mechanical, thermal, electrical, data processing, flight software and fields-of-view analysis (optical, radio frequency, and thermal), and (4) algorithms for the retrieval of environmental parameters.

4.0 TASK DESCRIPTIONS

The following services and technical data are required in order to support (1) the integration of the Saab/Austrian Aerospace GPSOS instrument on the baseline architecture of the LMMS satellite for the NPOESS program and (2) the evaluation of the algorithms for the retrieval of environmental parameters.

4.1 LMMS Interface Specifications and Drawings Applicable to GPSOS

4.1.1 Description

Review all Saab and Austrian Aerospace GPSOS inputs to the draft Unique Instrument Interface Control Document (ICD) and the General Instrument Interface Specification (GIIS).

The task will include the following:

- Review the Saab and Austrian Aerospace inputs to the Interface Control Documents and confirm that the Interfaces are compatible with the baseline architecture of the LMMS NPOESS satellite,
- Review all interface drawings and analyses - prepared with joint input by LMMS, Saab, and Austrian Aerospace - applicable to GPSOS; these include:
  - Mechanical interfaces,
  - Thermal interfaces,
  - Electrical interfaces,
  - Fields-of-view (optical, thermal, and radio frequency), and spacecraft configuration

4.1.2 Approach

- LMMS will analyze all GPSOS interface documents and ensure that the interfaces are consistent with the requirements of the LMMS NPOESS satellite
- LMMS will interface directly with Saab and Austrian Aerospace personnel to resolve any discrepancies between the proposed GPSOS interfaces and the LMMS satellite
- LMMS will document their evaluation of the interface documents

4.1.3 Schedule

The review of the interface documents will occur between March and December of 2000.

4.2 Test Plans and Procedures Applicable to GPSOS

4.2.1 Description

Review all Saab and Austrian Aerospace GPSOS test plans and procedures that are applicable to GPSOS

The task will include the requirements for the following tests and procedures:

- Instrument bench tests
- Spacecraft interface tests
- Spacecraft level tests
- Spacecraft environmental tests
- GPSOS instrument installation procedures

4.2.2 Approach

- LMMS will analyze all proposed test plans and procedures that relate to the integration of the GPSOS onto an LMMS satellite
- LMMS will interface directly with Saab personnel to resolve any discrepancies between the proposed GPSOS tests and LMMS standard procedures
- LMMS will document their evaluation of test procedures

4.2.3 Schedule

The review of the interface documents will occur between March 2000 and March of 2001.

4.3 Software Specifications applicable to GPSOS

4.3.1 Description

Review Saab software specifications applicable to GPSOS

The task will include reviews of the following software specifications:

- Specifications of the ground processing of the GPSOS sensor data
- Interface specific flight software specifications

4.3.2 Approach

- LMMS will analyze the specifications of the ground processing of data received from the GPSOS instrument
- LMMS will review and analyze the software specifications for flight software between the GPSOS instrument and the LMMS baseline satellite

4.3.3 Schedule

The review of the interface documents will occur between March 2000 and December 2001.

4.4 Host or Attend Meetings for the Exchange of Technical GPSOS Data

4.4.1 Description

Attend technical interchange meetings involving GPSOS

The task will include participation in the following types of reviews

- Design reviews
- Technical Interchange Meetings (TIMs)
- Test support reviews
- GPSOS and LMMS satellite baseline data
- On-orbit anomaly review and resolution

4.4.2 Approach

- At the request of the NPOESS Integrated Program Office, LMMS will attend reviews and technical interchange meetings that are required to coordinate the integration of the GPSOS sensor onto an LMMS baseline spacecraft.

4.4.3 Schedule

Interface meetings between Saab, Austrian Aerospace, and LMMS will occur between March 2000 and December 2002.

5.0 DELIVERABLES

Reports of the major interchange meetings will be delivered to the NPOESS IPO within 30 days of each meeting. The first meeting is scheduled for March 13, 2000. Subsequent interchange meetings are planned at approximately six-month intervals through December 2002.

PM/DTC Code 110412338
Amendment No. 2
March 9, 2001

AMENDMENT NO. 2
TECHNICAL ASSISTANCE AGREEMENT TA 221-00

BETWEEN

LOCKHEED MARTIN MISSILES & SPACE,

SAAB-ERICSSON SPACE AB, Sweden,

AUSTRIAN AEROSPACE, Austria,

DANISH METEOROLOGICAL INSTITUTE, Denmark,

And

TERMA ELEKTRONIK AS, Denmark

This Amendment No. 2 to TAA TA 221-00 is entered into between Lockheed Martin Corporation, a corporation of the State of Maryland, for its division Lockheed Martin Missiles & Space (hereinafter referred to as "LMMS") with offices at 1111 Lockheed Martin Way, P.O. Box 3504, Sunnyvale, California, United States of America, 94089-3504, and Lockheed Martin Managemnet & Data Systems, P. O. Box 8048, Philadelphia, PA 19101, Saab-Ericcson AB (hereinafter referred to as "Saab") whose office is situated at S-405 15 Göteberg, Sweden Austrian Aerospace ("AA")whose office is situated at Bretenfurter Strasse 106-108, A-1120 Vienna, Austria, , **the Danish Meteorological Institute (DMI)- a sub-contractor to Saab, located at Lyngbyvej 100 DK-2100 Copenhagen, Denmark and Terma Elektronik AS(Terma), subcontractor to Saab, located at Brejneroedvej 144, DK-3460 Birkeroed, Denmark** -and is effective upon the date of signature of the last party to sign the Agreement. LMMS, Saab, Austrian Aerospace, **DMI, and Terma** are hereinafter referred to as the Parties.

WHEREAS, LMMS and LMMDS desires to exchange technical data and provide defense services to Saab, AA , **DMI and Terma** relating to **(1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) (2) the requirement to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the**

LMMS spacecraft and (5) the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.

WHEREAS, LMMS is under contract (Number F04701-00-C-0501) with the Integrated Program Office comprised of Department of Commerce. NASA and the Department of Defense (see Statement of Work), and

WHEREAS, the IPO will obtain their own import and export licensing from the Department of State as required, and

WHEREAS, Saab is under contract with the IPO to provide both the GPSOS and its retrieval algorithms for environmental parameters, and

WHEREAS, AA , **Terma, and DMI** are under a sub-contract to Saab to help in the development of the hardware and science algorithms, ground support equipment for the GPSOS, and

WHEREAS, it is the intent of the IPO that the contractor selected for the Engineering and Manufacturing Development phase of NPOESS procure the GPSOS, and

WHEREAS, Saab, AA , DMI, and Terma desire to receive technical data and defense services related to (1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) (2) the requirement to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the LMMS spacecraft and (5) the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.

NOW THEREFORE, the parties desire to enter into this Technical Assistance Agreement as follows:

1. This Technical Assistance Agreement is intended to enable LMMS to perform defense services and disclose technical data during the Program Definition and Risk Reduction (PDRR) Phase and the Engineering and Manufacturing Development (EMD) Phase in support of the requirements to **(1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) (2) the requirement to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the LMMS spacecraft and (5) the import and**

possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.

THE NPOESS PROGRAM

(i) The Development of Environmental Sensors

Beginning in 1997, the IPO issued contracts for the development of five major sensors that are to be integrated on future NPOESS satellites. An important element of the contracts is the ultimate delivery to the IPO of the sensor plus algorithms that allow environmental parameters to be retrieved from the remotely-sensed data. One of the contracts is with Saab for the development of the GPSOS and its retrieval algorithms. Saab, AA, **DMI and Terma**, will continue the development of the GPSOS during the current Phase of their contract which extends with options beyond 2005.

Recently the IPO changed its acquisition strategy and will now require LMMS to establish contracts with the sensor vendors and to import/export hardware as necessary.

If required, the IPO will obtain their own import/export licensing from DTC.

(ii) The Program Definition and Risk Reduction Phase

LMMS is currently under contract - number #F04701-00-C-0501 - with the IPO. The contract is for the NPOESS Program Definition and Risk Reduction (PDRR) phase to provide a single, national polar-orbiting remote sensing capability to acquire, receive, and disseminate global and regional environmental data. A similar PDRR contract was awarded to TRW by the NPOESS IPO. A competitively awarded contract will be awarded for the Engineering and Manufacturing Development (EMD)/Production phase of the NPOESS program in March 2002.

The purpose of the PDRR contract is to reduce the risk of integrating the five NPOESS sensors onto the baseline of the LMMS satellite. The PDRR phase will end on 30 March 2002 or, if an option to the contract is exercised, on 31 December 2002. During PDRR LMMS will develop a baseline architecture for integrating all NPOESS sensors onto a satellite. In order to develop a viable baseline, LMMS will exchange information with Saab, AA, **DMI, and Terma** relating to the physical, electrical, mechanical, and thermal characteristics of the GPSOS. Similarly, during the LMMS PDRR phase of the program, Saab, AA, **DMI, and Terma** will acquire information from LMMS relating to the satellite constraints for the physical mounting of the GPSOS. The outcome of the interchange will be a satellite design that incorporates the GPSOS in a manner that is feasible, economical, and optimizes overall performance.

Finally, LMMS will also need to exchange technical data and provided defense services with Saab, AA, DMI and Terma to prepare a proposal for the following phase of the program, EMD.

For further information, see attached Statement of Work.

(iii) The Engineering and Manufacturing Development (EMD)/Production Phase

The next phase in the NPOESS program, EMD/Production, will call for the building of five satellites, ground stations, and data processing for systems operations. Although the sensor complement for each of the satellites is variable, the plan is to incorporate a GPSOS sensor on each of the NPOESS satellites. At EMD/Production Award, the IPO will transfer the responsibility for the operation, maintenance, upgrading, and performance of the sensors to the successful EMD/Production contractor. During EMD, LMMS will import the GPSOS into the United States in order to integrate it onto its satellites. LMMS may have to temporarily export it should problems arise with the instrument. **In addition LMMS will export and import the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator and possible repairs of the equipment. For this reason LMMS will apply for a DSP-5, DSP-73, and DSP-61, as required .**

2. It is understood that this Technical Assistance Agreement is entered into as required under U.S. Government regulations and, as such, it is an independent agreement between the parties, the terms of which will prevail, notwithstanding any conflict or inconsistency that may be contained in other arrangements between the Parties on the subject matter.

3. The parties agree to comply with all applicable sections of the International Traffic in Arms Regulations (ITAR) of the U.S. Department of State and that, more particularly, in accordance with such regulations the following conditions apply to this Agreement:

I. ITAR 124.7

PDRR PHASE

Hardware and Data

(1) **Change – Amendment No. 2 -** Data to be exchanged during the PDRR phase includes that necessary to integrate a GPSOS instrument and its retrieval algorithms with an NPOESS baseline spacecraft and to prepare a proposal for the EMD phase of the contract. Such data includes the requirements for (a) spacecraft to instrument interface specifications, (b) test plans, procedures and resulting data specific to the instrument interface and instrument performance, and (c) interface drawings and analysis for instrument specific mechanical, thermal, electrical, data processing, flight software and fields-of-view analysis (optical, radio frequency, and thermal) (see attachment A, Statement of Work).

EMD PHASE

Data and services to be exchanged during the EMD phase include that necessary to integrate GPSOS instruments, spacecraft electronics and their retrieval algorithms with the NPOESS satellites. Such data include the requirements for (a) the final spacecraft to instrument interface specifications, (b) implementation of test plans, procedures, and resulting data specific to the interface and instrument performance, (c) participation in the preflight check-out of each GPSOS instrument, and (d) final verification and validation of the GPSOS sensors and algorithms during post launch tests and field experiments.

All technical data and defense services transferred by Saab, AA, **DMI and Terma** to LMMS under this agreement pertains solely to the performance of retrieval algorithms, the interface between the LMMS architecture of the baseline spacecraft and the GPSOS instrument and the import and possible export of hardware and does not represent a transfer of technical data or defense services specific to the design, manufacture, assembly or test of the NPOESS spacecraft itself. LMMS will transfer to Saab, AA, DMI and Terma software interface specifications pertaining to GPSOS specific flight software data processing and ground support. No LMMS software code or algorithms will be exchanged.

LMMS may export /import special test equipment, spacecraft electronics, the spacecraft interface simulator, and the GPSOS including repairs of damaged items in connection with this agreement. LMMS is applying for the appropriate export licenses in conjunction with the approval of this amendment.

Technical Data and Defense Services

(2) The technical assistance and data to be provided under this agreement includes all tasks associated with (a) the requirements for the GPSOS algorithms for the retrieval of environmental parameters, and (b) the specifications for receiving, inspecting, bench level testing, installing on the NPOESS satellites, aligning on the NPOESS satellites, functionally verifying the instrument-to-spacecraft interface via spacecraft level testing and storing, (c) the establishment of the methodology for the review of instrument level and spacecraft level interface test data and anomaly resolution as required (d) preparation of the proposal for the EMD phase including technical and cost information for delivering the GPSOS instruments and for the assessment of the instrument performance during post launch check out, (e) requirements of the ground processing system and specification of ancillary data needed to generate environmental and space parameters, and (f) recommendations and, if approved, implementation of capabilities to improve sensor and algorithm cost and overall technical performance.

(3) The agreement is valid through 31 December 2005.

The effort intended to be accomplished under this agreement will take place in Sweden, Austria, Denmark or the United States of America. Furthermore it is understood that employees of Saab, AA, DMI and Terma who are foreign nationals and whose country of origin is listed below may require access to technical data and information exchanged hereunder.

Countries:

Argentina, Australia, Belgium, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, S. Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

LMMS will obtain a Non-Disclosure Agreement (NDA) from Saab, AA, **Terma or DMI** for any third country foreign national recipient prior to the exchange of technical data.

II. ITAR 124.8

(1) This Agreement shall not enter into force and shall not be amended or extended without the prior written approval of the Department of State of the U.S. Government.

(2) This Agreement is subject to all United States laws and regulations relating to exports and to all administrative acts of the U.S. Government pursuant to such laws and regulations.

(3) The Parties to this Agreement agree that the obligations contained in this Agreement shall not affect the performance of any obligations created by prior contracts or subcontracts which the Parties may have individually or collectively with the U.S. Government.

(4) No liability will be incurred by or attributed to the U.S. Government in connection with any possible infringement of privately owned patent or proprietary rights, either domestic or foreign, by reason of the U.S. Government's approval of this Agreement.

(5) The technical data or defense service exported from the United States in furtherance of this Agreement and any defense article which may be produced or manufactured from such technical data or defense service may not be transferred to a person in a third country or to a national of a third country except as specifically authorized in this Agreement unless the prior written approval of the Department of State has been obtained.

In addition once Saab, AA, Terma and DMI provides copies of executed NDAs containing the ITAR 124.8 clauses to LMMS, exports may be made

to employees who hold dual citizenship in or who are foreign nationals of the following countries:

Argentina, Australia, Belgium, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, S. Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

(6) All provisions in this Agreement which refer to the United States Government and the Department of State will remain binding on the Parties after the termination of the Agreement.

4. It is understood that disclosure of information by Saab to LMMS is subject to any rules, restrictions or laws of Sweden. It is understood that disclosure of information by AA to LMMS is subject to any rules, restrictions or laws of Austria. Further it is understood that disclosure of information by **DMI and Terma** to LMMS is subject to any rules, restrictions or laws of **Denmark**.

5. Technical data relating to this program may be exchanged with Saab, Austrian Aerospace, **DMI and Terma** contractors/subcontractors in Sweden, Austria and Denmark provided that, prior to the release of any technical data, Saab, AA, **DMI and Terma** executes a Non-Disclosure Agreement (NDA) with each company. The NDA will incorporate all of the provisions of this Agreement which refer to the U.S. Government and the Department of State (i.e., Section II – ITAR 22 CFR 124.8 of this Agreement). Copies of the executed NDAs referencing this Agreement by number will be provided to and maintained by LMMS for five years from the expiration of the Agreement.

Except as modified hereto, in every other respect, the subject Agreement shall remain unchanged and in full force and effect. If the forgoing is acceptable, please so signify by signing this document and returning the executed original for countersignature by Lockheed Martin Space Systems Company. One fully executed copy will be returned to you for your file, whereupon this letter shall constitute Amendment No. 2 to the aforesaid Agreement. This Amendment shall be effective upon approval by the Government of the United States and upon execution by all parties, where ever occurs last.

Lockheed Martin Missiles & Space
By _____

Printed Name _____

Title _____

Date _____

Saab-Ericsson Space AB
By _____

Printed Name _____

Title _____

Date _____

Austrian Aerospace
By _____

Printed Name _____

Title _____

Date _____

Danish Meteorological Institute
By _____

Printed Name _____

Title _____

Date _____

Terma Elektronik As
By _____

Printed Name _____

Title _____

Date _____

PM/DTC Code 110412338
Amendment No. 2
March 9, 2001

Attachment A

STATEMENT OF WORK

Between

Lockheed Martin Missiles & Space (LMMS)

Saab-Ericsson Space AB, Sweden,

Austrian Aerospace, Austria,

Danish Meteorological Institute, Denmark,
And

Terma Elektronik AS, Denamrk

For the
Global Positioning System Occultation Sensor (GPSOS)

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NOTE: SOW Changes in this Amendment No. 2 are in "bold type".

1.0 INTRODUCTION

This Technical Assistance Agreement is intended to enable LMMS to perform defense services and disclose technical data during the Program Definition and Risk Reduction (PDRR) Phase and the Engineering and Manufacturing Development (EMD) Phase in support of the requirements for **(1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) (2) the requirement to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the LMMS spacecraft and (5) the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.**

THE NPOESS PROGRAM

(i) The Development of Environmental Sensors

Beginning in 1997, the IPO issued contracts for the development of five major sensors that are to be integrated on future NPOESS satellites. An important element of the contracts is the ultimate delivery to the IPO of the sensor plus algorithms that allow environmental parameters to be retrieved from the remotely-sensed data. One of the contracts is with Saab for the development of the GPSOS and its retrieval algorithms. Saab, AA. **DMI, and Terma** will continue the development of the GPSOS during the current Phase of their contract which extends with options beyond 2005.

Recently the IPO changed its acquisition strategy and will now require LMMS to establish contracts with the sensor vendors and to import/export hardware as necessary.

If required, the IPO will obtain their own import/export licensing *from DTC.*

(ii) The Program Definition and Risk Reduction Phase

LMMS is currently under contract - number #F04701-00-C-0501 - with the IPO. The contract is for the NPOESS Program Definition and Risk Reduction (PDRR) phase to provide a single, national polar-orbiting remote sensing capability to acquire, receive, and disseminate global and regional environmental data. A similar PDRR contract was awarded to TRW by the NPOESS IPO. A competitively awarded contract will be awarded for the Engineering and Manufacturing Development (EMD)/Production phase of the NPOESS program in March 2002.

The purpose of the PDRR contract is to reduce the risk of integrating the five NPOESS sensors onto the baseline of the LMMS satellite. The PDRR phase will end on 30 March 2002 or, if an option to the contract is exercised, on 31 December 2002. During PDRR LMMS will develop a baseline architecture for integrating all NPOESS sensors onto a satellite. In order to develop a viable baseline, LMMS will exchange information with Saab, AA, **DMI, and Terma** relating to the physical, electrical, mechanical, and thermal characteristics of the GPSOS. Similarly, during the LMMS PDRR phase of the program, Saab, AA, **DMI and Terma** will acquire information from LMMS relating to the satellite constraints for the physical mounting of the GPSOS. The outcome of the interchange will be a satellite design that incorporates the GPSOS in a manner that is feasible, economical, and optimizes overall performance.

Finally, LMMS will also need to exchange technical data and provided defense services with Saab, AA, **DMI, and Terma** to prepare a proposal for the following phase of the program, EMD.

(iii) The Engineering and Manufacturing Development (EMD)/Production Phase

The next phase in the NPOESS program, EMD/Production, will call for the building of five satellites, ground stations, and data processing for systems operations. Although the sensor complement for each of the satellites is variable, the plan is to incorporate a GPSOS sensor on each of the NPOESS satellites. At EMD/Production the IPO will transfer the responsibility for the operation, maintenance, upgrading, and performance of the sensors to the successful EMD/Production contractor. **During EMD, LMMS will import the GPSOS into the United States in order to integrate it onto its satellites. LMMS may have to temporarily export it should problems arise with the instrument. In addition, LMMS will export / import support test equipment, spacecraft electronics, and the spacecraft interface simulator. For this reason LMMS will apply for an export license e.g., DSP-5, DSP-73, and DSP 61.**

2.0 SCOPE

The scope of this effort during the PDRR phase of the LMMS contract with the IPO, consists of Lockheed Martin Missiles and Space (LMMS) exchanging technical date and providing defense services to Saab Ericsson Space AB (Saab), Austrian Aerospace (AA), **Terma Elektronik AS (Terma), and the Danish Meteorological Institute (DMI)** necessary for the development of the Global Position System Occultation Sensor (GPSOS). The GPSOS is currently under development by Saab, Austrian Aerospace, **Terma and DMI** through a contract with the Integrated Program Office of the United States Government. The work will enable LMMS, Saab, AA , **DMI and Terma** to disclose technical data and provide defense services in support of **(1) the integration of the Global Positioning System Occultation Sensor (GPSOS) and its retrieval algorithms onto the LMMS baseline satellite designed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS) (2) the requirement**

to evaluate the performance of algorithms for the retrieval of environmental parameters, (3) the preparation of a proposal for the Engineering and Manufacturing Development phase, (4) the integration of the GPSOS onto the LMMS spacecraft and (5) the import and possible export of the GPSOS, support test equipment, spacecraft electronics, and the spacecraft interface simulator.

3.0 OBJECTIVE

The objective of the efforts is to exchange technical date and provide defense services associated with installing the GPSOS on an LMMS baseline spacecraft.

Such technical data to be exchanged includes: (1) spacecraft to instrument interface specifications, (2) test plans and procedures specific to the instrument interface and instrument performance, (3) interface drawings and analysis for instrument specific mechanical, thermal, electrical, data processing, flight software and fields-of-view analysis (optical, radio frequency, and thermal), (4) algorithms for the retrieval of environmental parameters, **and (5) verification and validation results during post-launch evaluation of the GPSOS instruments and their algorithms.**

4.0 TASK DESCRIPTIONS

The following services and technical data are required in order to support (1) the integration of the Saab/Austrian Aerospace GPSOS instrument on the baseline architecture of the LMMS satellite for the NPOESS program, (2) the evaluation of the algorithms for the retrieval of environmental parameters, **(3) verifying the performance to retrieve environmental data from simulated GPSOS data, (4) prepare a proposal for the EMD phase, (5) integrate the GPSOS onto the LMMS satellites, and (6) import and possibly export the GPSOS and hardware.**

4.1 LMMS Interface Specifications and Drawings Applicable to GPSOS

4.1.1 Description

Review all Saab, AA, **DMI, Terma** GPSOS inputs to the draft Unique Instrument Interface Control Document (ICD) and the General Instrument Interface Specification (GIIS).

The task will include the following:

- Review the Saab, AA, **DMI and Terma** inputs to the Interface Control Documents and confirm that the Interfaces are compatible with the baseline architecture of the LMMS NPOESS satellite,
- Review all interface drawings and analyses - prepared with joint input by LMMS, Saab, AA, **DMI and Terma** - applicable to GPSOS; these include:
  - Mechanical interfaces,

- Thermal interfaces,
- Electrical interfaces,
- Fields-of-view (optical, thermal, and radio frequency). and spacecraft configuration

4.1.2 Approach

- LMMS will analyze all GPSOS interface documents and ensure that the interfaces are consistent with the requirements of the LMMS NPOESS satellite
- LMMS will interface directly with Saab, **Terma, DMI** and AA personnel to resolve any discrepancies between the proposed GPSOS interfaces and the LMMS satellite
- LMMS will document their evaluation of the interface documents

4.1.3 Schedule

The review of the interface documents will occur from the date of this approved Amendment and December 31, 2005 with Saab, AA, Terma and DMI.

4.2 Test Plans and Procedures Applicable to GPSOS

4.2.1 Description

Review all Saab, **Terma, DMI** and AA GPSOS test plans and procedures that are applicable to GPSOS

The task will include the requirements for the following tests and procedures:

- Instrument bench tests
- Spacecraft interface tests
- Spacecraft level tests
- Spacecraft environmental tests
- GPSOS instrument installation procedures

4.2.2 Approach

- LMMS will analyze all proposed test plans and procedures that relate to the integration of the GPSOS onto an LMMS satellite
- LMMS will interface directly with Saab personnel to resolve any discrepancies between the proposed GPSOS tests and LMMS standard procedures
- LMMS will document their evaluation of test procedures

4.2.3 Schedule

The review of the interface documents during the EMD phase of the NPOESS proposal will occur between December 2001 and 2015. LMMS will amend this TAA accordingly over the life of the program.

4.3 Software Specifications applicable to GPSOS

4.3.1 Description

Review Saab software specifications applicable to GPSOS

The task will include reviews of the following software specifications:

- Specifications of the ground processing of the GPSOS sensor data
- Interface specific flight software specifications

4.3.2 Approach

- LMMS will analyze the specifications of the ground processing of data received from the GPSOS instrument
- LMMS will review and analyze the software specifications for flight software between the GPSOS instrument and the LMMS baseline satellite

4.3.3 Schedule

The review of the interface documents will occur between December 2001 and 2015. LMMS will amend this agreement accordingly.

4.4 Host or Attend Meetings for the Exchange of Technical GPSOS Data

4.4.1 Description

Attend technical interchange meetings involving GPSOS

The task will include participation in the following types of reviews

- Design reviews
- Technical Interchange Meetings (TIMs)
- Test support reviews
- GPSOS and LMMS satellite baseline data
- On-orbit anomaly review and resolution
- **Assessment of sensor and algorithm performance throughout the lifetime of each GPSOS instrument**

4.4.2 Approach

- At the request of the NPOESS Integrated Program Office, LMMS will attend reviews and technical interchange meetings that are required to coordinate the integration of the GPSOS sensor onto an LMMS baseline spacecraft.

4.4.3 Schedule

Interface meetings between Saab, AA, DMI, Terma , and LMMS will occur between the date of this approved amendment and December 2015. LMMS will amend this agreement accordingly.

4.5 Prepare EMD Proposal

4.5.1 Description

Saab, AA, Terma and DMI will support LMMS as it prepares its proposal for the EMD phase technical and cost proposal.

4.5.2 Approach

- **During the EMD phase LMMS will make available the necessary NPOESS data to Saab, AA, Terma and DMI . In the same time frame EMS will make performance data and other related information LMMS.**
- **Several meetings will be held with Saab, AA, Terma and DMI to determine the level of support that will be required during the EMD phase.**

4.5.3 Schedule

Saab, AA, Terma and DMI will provide information to support proposal activities between the date of execution of an approved TAA and December 2003.

4.6 Import and Export the GPSOS and associated hardware

4.6.1 Description

Each GPSOS Sensor is comprised of the following eight items:

1 - GPSOS Velocity Antenna (GVA)
1 - GPSOS Anti-Velocity Antenna (GAVA)
1 - GPSOS Zenith Antenna (GZA)
1 – GVA Radio Frequency Conditioning Unit (RFCU-GVA)
1 – GAVA Radio Frequency Conditioning Unit (RFCU-GAVA)
1 – GZA Radio Frequency Conditioning Unit (RFCU-GZA)
1 – GPSOS Electronics Unit
1 – Set Interconnecting Harnesses

4.6.2 Approach

GPSOS sensors are required for NPOESS Satellites O1 and O3. For each O1 and O3 NPOESS satellite to be built one GPSOS sensor will be imported. With the first sensor to be imported a set of Ground and Handling Test Equipment (GPSOS GSE) will be imported. In the event that flight hardware or test equipment experiences a failure, said equipment may be returned to the supplier for repair and then returned (temporary export). Each hardware (flight or GSE) shipment will include the appropriate manuals and drawings defining the equipment being imported.

4.6.3 Schedule

Sensor deliveries will be as follows:

1 GPSOS + Test Equipment	5/01/06
1 GPSOS	8/01/07
1 GPSOS	10/03/08
1 GPSOS	1/04/10
1 GPSOS	12/17/12

4.7 Integration of GPSOS onto the Satellite

4.7.1 Description

The GPSOS team will support the integration and test of each GPSOS Sensor into the NPOESS system.

4.7.2 Approach

Saab, Terma and DMI personnel will support the integration of the NPOESS sensor onto the NPOESS Spacecraft. This support shall consist of personnel who shall support the installation of each GPSOS on to the NPOESS spacecraft, evaluate GPSOS test date to ensure proper operation and assist in trouble shooting any problems that arise.

4.7.3 Schedule

Integration and test support is scheduled during the following periods:

NPOESS C1	5/01/06 – 9/01/08
NPOESS C2	8/01/07 – 6/01/10
NPOESS C3	1/04/10 – 7/02/14
NPOESS C5	12/17/12 – 7/02/20

5.0 DELIVERABLES

Reports of the major interchange meetings will be delivered to the NPOESS IPO within 30 days of each meeting. **Interchange meetings are planned at approximately six-month intervals from December 2001 through 2015.**